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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/894,049	06/28/2001	Farnaz Parhami	373722002900	5445

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EXAMINER	
STAHL, MICHAEL J	
ART UNIT	PAPER NUMBER
2874	

DATE MAILED: 06/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Offic Action Summary	Application No.	Applicant(s)	
	09/894,049	PARHAMI ET AL.	
	Examin r	Art Unit	
	Mike Stahl	2874	

-- The MAILING DATE of this communicati n appears on the cover sheet with the corresp ndence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 March 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-43,45 and 47-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-25,49 and 50* is/are allowed.

6)☒ Claim(s) *26-43,45,47 and 48* is/are rejected.

7)☒ Claim(s) *35-38* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

This office action is in response to the amendment filed March 22, 2004. The changes to the specification and claims are noted. The corrected version of fig. 4 is approved. All objections and rejections made in the last office action are withdrawn in view of the amendment. Claims 1-43, 45, and 47-50 are pending.

Response to Amendment

The amendment filed March 22, 2004 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: Claim 26 as amended recites a lower limit of 2 % by weight for the dopant in the top cladding layer. The only lower limit previously mentioned in the disclosure is 6 % by weight. The examiner cannot identify support for the newly recited lower limit in the original disclosure. If applicant identifies where this limitation is supported by the application as filed, the objection will be withdrawn.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 26-43, 45, and 47-48 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Claim 26 contains subject matter which was

not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. Refer to the "Response to Amendment" section above for explanation of the subject matter regarded as new. Claims 27-43, 45, and 47-48 are rejected by dependence from claim 26.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 26-34, 39-43, 45, and 47-48 are rejected under 35 U.S.C. 103(a) as being obvious over McGreer (US 2002/0181868) in view of Shimoda (US 6396988).

The applied McGreer reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a

terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

McGreer discloses an arrayed waveguide grating (figs. 3A-3B) including a substrate **88**, a top cladding layer **92** disposed on the substrate, and at least one waveguide **72-76** disposed between the substrate and the top cladding layer. The widths of the waveguides are selected to provide a predetermined value of polarization dependent wavelength (PDW) as indicated at [0026] and [0055].

McGreer teaches that the top cladding layer typically includes doped silica ([0062]) but does not state the dopant concentration. Shimoda (US 6396988) discloses an arrayed waveguide grating having a substrate, a top cladding layer, and a waveguide disposed between the substrate and the top cladding layer (see e.g. fig. 7C). The top cladding layer in Shimoda generally includes silica doped with boron and phosphorus. Shimoda teaches that the PDW depends on the dopant concentration of the cladding layers (col. 14 lines 13-22) and that the dopant concentration of the top cladding layer controls its thermal expansion coefficient which in turn affects the stress between the top cladding layer and underlying layers (col. 14 line 56 – col. 15 line 8). See also figs. 4 and 5. Furthermore, Shimoda discloses factors which may be used to determine appropriate upper and lower bounds for the concentration of the dopants (col. 14 lines

17-43). It is noted that Shimoda recommends a total dopant concentration of at least 8.8 % by weight, which lies within the claimed range.

It would have been obvious to a person having ordinary skill in the art to apply the teachings of Shimoda to the McGreer device by determining an appropriate dopant concentration for the top cladding layer such that its thermal expansion coefficient is close to that of the underlying layers in order to reduce the stress therebetween (and to consequently achieve a low PDW, which is one of the goals of McGreer). It would also have been obvious to a skilled person to follow the guidelines expressly described in Shimoda to determine suitable upper and lower bounds for the dopant concentration of the top cladding layer. The McGreer device modified as proposed above would have satisfied claims 26 and 48.

As to claims 27 and 32, the predetermined value of PDW may be minimized to zero.

As to claims 28, 30, and 31, the PDW ultimately depends on the stress distribution of the top cladding and the elastic modulus and coefficient of thermal expansion of the top cladding and waveguide layers.

As to claim 29, the top cladding **92** has a predetermined composition (doped silica).

As to claim 33, the substrate **88** comprises a silicon wafer ([0062]).

As to claim 34, McGreer does not specify the thickness of the silicon wafer used as the substrate. However, it would have been obvious to a person of ordinary skill in the art to design the substrate of the McGreer device to have a suitable thickness, or alternatively, to use any commercially available silicon wafer which already has a suitable thickness. It is noted that the present specification mentions 625 microns merely as an example and does not describe any criticality for the substrate thickness.

As to claim 39, the waveguide core and top cladding comprise doped silica.

As to claims 40 and 45, it would have been obvious to a person of ordinary skill in the art to use the dopants taught by Shimoda (boron and phosphorus) in the proposed modification since Shimoda discloses that these particular dopants achieve the desired effects.

As to claim 41, the grating may alternatively include polymer ([0062]).

As to claim 42, the waveguide core has a height between 5 and 12 microns, which overlaps the recited range. As to claim 43, although McGreer does not disclose an embodiment in which the waveguide core height is exactly 6 microns, it would have been obvious to a person of ordinary skill in the art to construct the McGreer device with any suitable waveguide core height. It is noted that applicant does not associate any criticality with the particular example of 6 microns.

As to claim 47, McGreer does not disclose the recited change in manufacturing temperature. It would have been obvious to a person of ordinary skill in the art to determine a suitable temperature change for a given process of fabricating the McGreer device. Applicant has not described any unexpected benefits associated with using a 900 °C temperature change.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Response to Arguments

Applicant's remarks concerning the rejection under Roberts in the last office action are generally persuasive. In particular applicant argues that the thermal growth process used to form the top cladding layer in Roberts is not well suited to incorporating dopant in significant amounts, at least not on the order of a few weight percent as claimed. The examiner agrees with applicant's reasoning and also notes that Roberts does not mention doping the silicon layer which is to be oxidized and does not mention the possibility of using other processes (such as deposition) to form the top cladding. Accordingly the rejection under Roberts has been withdrawn.

Allowable Subject Matter

Claims 1-25 remain allowed for the reasons given in the last office action. New claims 49 and 50 are allowed since they depend from previously allowed claims 1 and 22 respectively.

Claims 35-38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and if the limitations of the base claim are rewritten to overcome the above rejection under 35 U.S.C. 112 first paragraph. With regard to claim 35, the applied references fail to disclose or suggest disposing the substrate over a first layer of silica. There is no apparent reason why a person of ordinary skill would be motivated to modify the McGreer

device by disposing the disclosed silicon wafer over a separate silica layer since this would require additional material and processing steps. Moreover, McGreer teaches that the waveguide layers are deposited on the silicon wafer, so it cannot be assumed that the silicon wafer inherently includes an oxide layer on the surface opposite the waveguide layers as a result of the process of fabricating the waveguide layers (e.g. by oxidizing the silicon wafer to form the lower cladding). Claims 36-38 depend from claim 35.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

US 6580864, US 6553170, US 6201918, US 5408569, and US 5195161 are cited on the attached PTO-892 form as disclosing relevant subject matter.

Any inquiry concerning this communication should be directed to Mike Stahl at (571) 272-2360. Official communications which are eligible for submission by facsimile and which pertain to this application may be faxed to (703) 872-9306. Inquiries of a general or clerical nature (e.g., a request for a missing form or paper, etc.) should be directed to the technical support staff supervisor at (571) 272-1626.

MJS

Michael J. Stahl
Patent Examiner
Art Unit 2874

June 12, 2004

Rodney Bovernick
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Technology Center 2800